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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/807,858	03/24/2004	Michael B. Korzenski	020732-110.694	5492
24239 7590 02/20/2008 MOORE & VAN ALLEN PLLC P.O. BOX 13706 Research Triangle Park, NC 27709				
EXAMINER				
AHMED, SIAMIM				
ART UNIT		PAPER NUMBER		
1792				
MAIL DATE		DELIVERY MODE		
02/20/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/807,858

**Applicant(s)**

KORZENSKI ET AL.

**Examiner**

Shamim Ahmed

**Art Unit**

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 December 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) 1-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 15-37 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/CIS)
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date 12/3/07

## DETAILED ACTION

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/3/07 has been entered.
2. The declaration filed on 12/3/07 under 37 CFR 1.131 has been considered but is ineffective to overcome the Sehgal (US publication No. 2004/0050406) reference.
3. The evidence (Exhibit A) submitted is insufficient to establish a conception of the invention prior to the effective date of the Seghal reference because the exhibit is not a legible copy of the laboratory note book pages and one could not find any evidence or data which shows the reduction to practice. While conception is the mental part of the inventive act, it must be capable of proof, such as by demonstrative evidence or by a complete disclosure to another. Conception is more than a vague idea of how to solve a problem. The requisite means themselves and their interaction must also be comprehended. See *Mergenthaler v. Scudder*, 1897 C.D. 724, 81 O.G. 1417 (D.C. Cir. 1897).
4. Therefore the rejections based on the Sehgal ('406) are repeated herein as follows along with a new rejection.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 15-23, 25-27, 30, 35 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sehgal (US 2004/0050406 A1).

Sehgal teaches a process for removing photoresist or BARC using a composition in which the composition comprises supercritical fluid (SCF) of carbon dioxide, co solvent such as isopropanol (paragraphs 0017,0028-0029 and 0069) and hydrogen peroxide (paragraph 0043).

Sehgal teaches that the composition may include ammonium fluoride (paragraph 0048), wherein the oxidizer or the ammonium fluoride may work as the claimed etchant.

Art Unit: 1792

Sehgal teaches the composition may include surfactant, which may be anionic, cationic or non-ionic (see paragraphs 0045 and 0060).

Sehgal also teaches the composition may include accelerator to the co-solvent mixture such as sulfuric acid (paragraph 0053).

Sehgal teaches the temperature of the super critical fluid will be much higher than critical temperature of 31 degree C (paragraph 0010) and that could be 55 degree C as explained in example 1 (paragraph 0074).

Sehgal also teaches the higher temperature (about 80 degree) and pressure will accelerate the stripping of photoresist using the supercritical fluid (paragraph 0058).

Therefore, it would have been obvious to one of ordinary skilled in the art would have been motivated to do so for accelerating the stripping rate.

As to claim 37, Sehgal teaches the use of isopropyl amine in the composition including SCF (see claim 21).

8. Claims 24,28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sehgal (US 2004/0050406 A1) as applied to claims 15-23,25-27,30 and 35 above, and further in view of De Young et al (6,669,785).

As to claim 24, Sehgal discloses above in the paragraph 7 but fail to teach the etchant could comprises triethylamine trihydrofluoride.

However, De Young et al disclose a composition for removing photoresist/antireflective coating with additives such as hydrogen fluoride or triethylamine trihydrofluoride (col.2, lines 26-41 and col.4, lines 43-65).

As to claims 28-30, since the photoresist and the BARC material is removing, it would have been obvious to have residual amount of the above materials present in the removing solution.

9. Claims 31-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sehgal (US 2004/0050406 A1) as applied to claims 15-23,25-27,30 above, and further in view of Xu et al (US 2003/0125225).

Sehgal discloses above in the paragraph 7 but fail to teach the repetitive carrying out the dynamic flow contacting and static soaking contacting the substrate to be cleaned.

However, Xu et al teach a cleaning/removal process of unwanted residue including unexposed photoresist using supercritical fluid composition as claimed including the steps of contacting the fluid to the substrate by flowing and repeated cycles of soaking to achieve substantially complete removal of the unwanted materials from the substrate (paragraphs 0059-0061).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of claimed invention to employ Xu et al's teaching into Sehgal's process for complete removal of the residual material in order to have a cleaned surface as taught by Xu et al.

10. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sehgal (US 2004/0050406 A1) as applied to claims 15-23,25-27,30 above, and further in view of Hess et al (6,627,588).

Sehgal discloses above in the paragraph 7 but fail to teach the removal process involve the removal of ion implanted photoresist.

However, it would have been obvious to one of ordinary skilled in the art at the time of claimed invention to remove the ion implanted photoresist as Hess et al teach the conventional removal of photoresist and ion implanted photoresist using isopropanol (abstract and col.1, lines 50-61).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of claimed invention to employ Hess et al's teaching into Sehgal's process for efficient cleaning of the ion implanted photoresist as well as the photoresist in order to have cleaner surface to work with in the subsequent processing.

In the above, examiner assuming the implanted ion came from the ion-implantation of the substrate prior to the removal process.

11. Claims 15-23, 25-27, 30 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sehgal (US 2004/0011386 A1) in view of Skee (US 2002/0077259).

Sehgal teaches a process for removing photoresist or BARC using a composition in which the composition comprises supercritical fluid (SCF) of carbon dioxide, co solvent such as isopropanol (paragraphs 0021,0023-0024 and 0040) and hydrogen peroxide (paragraph 0035).

Sehgal teaches that the composition may include HF or ammonium fluoride (paragraph 0038), wherein the oxidizer or HF or the ammonium fluoride may work as the claimed etchant.

Sehgal teaches the composition may include surfactant (see paragraph 0037).

Sehgal remain silent regarding the surfactant may comprise nonionic or anionic.

However, Skee teaches the use of non-ionic, cationic or anionic surfactant in a composition which can be used in microelectronic industries for cleaning or stripping for removing photoresist (abstract). Skee also teach that the addition of a surfactant will reduce the surface tension of the formulation and improve the wetting of the surface to be cleaned and therefore improve the cleaning action of the composition. The surfactant may also be added to reduce aluminum corrosion rates if further aluminum corrosion inhibition is desired (see paragraph 0045).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of claimed invention to employ Skee's commonly used surfactant into Sehgal's process for improving the cleaning or stripping process as suggested by Skee.

Sehgal teaches the temperature of the super critical fluid will be much higher than critical temperature of 31 degree C (paragraph 0007) and that could be 55 degree C as explained in example 1 (paragraph 0052).

Sehgal also teaches the use of higher temperature (about 100 degree) during the stripping of photoresist using the supercritical fluid (paragraph 0056).



Therefore, it would have been obvious to one of ordinary skill in the art would have been motivated to do so as the higher temperature will accelerate the stripping rate.

12. Claims 24,28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sehgal (US 2004/000011386 A1) as applied to claims 15-23,25-27,30 and 35 above, and further in view of De Young et al (6,669,785).

As to claim 24, Sehgal discloses above in the paragraph 11 but fail to teach the etchant could comprises triethylamine trihydrofluoride.

However, De Young et al disclose a composition for removing photoresist/antireflective coating with additives such as hydrogen fluoride or triethylamine trihydrofluoride (col.2, lines 26-41 and col.4, lines 43-65).

As to claims 28-30, since the photoresist and the BARC material is removing, it would have been obvious to have residual amount of the above materials present in the removing solution.

13. Claims 31-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sehgal (US 2004/0011386 A1) as applied to claims 15-23,25-27,30 above, and further in view of Xu et al (US 2003/0125225).

Sehgal discloses above in the paragraph 11 but fail to teach the repetitive carrying out the dynamic flow contacting and static soaking contacting the substrate to be cleaned.

However, Xu et al teach a cleaning/removal process of unwanted residue including unexposed photoresist using supercritical fluid composition as claimed including the steps of contacting the fluid to the substrate by flowing and repeated cycles of soaking to achieve substantially complete removal of the unwanted materials from the substrate (paragraphs 0059-0061).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of claimed invention to employ Xu et al's teaching into Sehgal's process for complete removal of the residual material in order to have a cleaned surface as taught by Xu et al.

14. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sehgal (US 2004/0011386 A1) as applied to claims 15-23,25-27,30 above, and further in view of Hess et al (6,627,588).

Sehgal discloses above in the paragraph 11 but fail to teach the removal process involve the removal of ion implanted photoresist.

However, it would have been obvious to one of ordinary skilled in the art at the time of claimed invention to remove the ion-implanted photoresist as Hess et al teach the conventional removal of photoresist and ion implanted photoresist using isopropanol (abstract and col.1, lines 50-61).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of claimed invention to employ Hess et al's teaching into Sehgal's process for

Art Unit: 1792

efficient cleaning of the ion implanted photoresist as well as the photoresist in order to have cleaner surface to work with in the subsequent processing.

In the above, examiner assuming the implanted ion came from the ion-implantation of the substrate prior to the removal process.

15. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sehgal ('386) as applied above, and further in view of Yamamoto et al (2003/0064326).

Sehgal discusses above in the paragraph 11 except the solvent comprises at least one amine.

However, Yamamoto et al disclose a composition for stripping photoresist including amine based solvent for improved stripping process (paragraphs 0016 and 0068).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of claimed invention to employ Yamamoto et al's teaching into Sehgal's composition for improve stripping of the resist as suggested by Yamamoto et al.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shamim Ahmed whose telephone number is (571) 272-1457. The examiner can normally be reached on Tu-Fri (12:30-10:30) Every Monday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine G. Norton can be reached on (571) 272-1465. The fax phone

Art Unit: 1792

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Shamim Ahmed  
Primary Examiner  
Art Unit 1792

SA  
February 14, 2008

/Shamim Ahmed/  
Primary Examiner, Art Unit 1792